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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,099	01/28/2004	Hiroyuki Hirai	1330-0138P	9728
2292 7590 12/12/2008 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747				
EXAMINER ZIMMERMAN, JOSHUA D				
ART UNIT 2854		PAPER NUMBER		
NOTIFICATION DATE 12/12/2008		DELIVERY MODE ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary

Application No.

10/765,099

Applicant(s)

HIRAI, HIROYUKI

Examiner

JOSHUA D. ZIMMERMAN

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2854

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 1-5, 10-14 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6-9, 15-18, 20 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Kudas et al. (US 2006/0001726) in view of Brook-Levinson et al. (US 2003/0180448).

Regarding claim 6, Kudas et al. teach "a method for producing a printed circuit board (paragraph 234) comprising the steps of drawing a conductive pattern on a substrate (paragraph 16) by an ink comprising a dispersion of fine particles of a metal oxide or hydroxide (paragraphs 30 and 35); and reducing at least part of said fine particles of a metal oxide or hydroxide to a metal to form a conductive pattern (paragraphs 23 and 35)."

Kudas et al. fail to teach that the substrate has "fine pores or grooves in a portion on which the printed circuit is formed."

However, Brook-Levinson et al. teach a method for fabricating printed circuit boards (PCBs) wherein the substrate is grooved in order to improve adhesion with the substrate (paragraph 24).

Therefore, at the time of the invention, it would have been obvious to one having ordinary skill in the art to provide the substrate of Kodas et al. with grooves in order to improve adhesion in the PCB.

Regarding claim 7 Kodas et al. teach "wherein said pattern is drawn by said ink according to a pattern information stored in a computer (paragraph 234)."

Regarding claim 8, Kodas et al., as modified, teach all that is claimed, as in claims 6 and 15 above, including the application of heat in order to reduce the metal precursors (paragraph 183). Kodas et al. fail to specifically teach how the heat is applied. However, Examiner takes official notice that it was known at the time of the invention to use energy irradiation to cause heating. Therefore, at the time of the invention, it would have been obvious to one having ordinary skill in the art to conduct energy irradiation "in the process of forming said conductive pattern" in the method of Kodas et al. in order to apply heat.

Regarding claim 9, Kodas et al. as modified teach all that is claimed, as in claim 6 above, but fail to specifically mention the type of atmosphere used during the reduction process. However, Examiner takes Official Notice that, at the time of the invention, it was known to use non-reactive gases (such as nitrogen, helium, neon or argon) as the atmosphere for conducting reduction reactions in order to prevent oxidation of material being reduced. Therefore, at the time of the invention, it would have been obvious to one having ordinary skill in the art to modify the method of Kodas et al. such that "the formation of said conductive pattern is conducted in an inert gas" which is "selected from the group consisting of nitrogen, helium, neon and argon" in

order to achieve the expected result of preventing unwanted oxidation in the reduction process.

3. Claims 15-18, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodas et al. (US 2006/0001726) in view of Brook-Levinson et al. (US 2003/0180448), further in view of Dietz et al. (US 2002/0040662).

Regarding claim 15, Kodas et al. teach "a method for producing a printed circuit board (paragraph 234) comprising the steps of mixing at least two liquid parts (inherent in the embodiment of paragraphs 89+) comprising a dispersion of fine particles of a metal oxide or hydroxide (paragraphs 30 and 35), and a reducing agent having a reducing activity to said fine particles of a metal oxide or hydroxide or its solution to prepare an ink (paragraphs 30, 35 and 89); and

drawing a pattern by said ink on a substrate (paragraph 16), thereby reducing at least part of said fine particles of a metal oxide or hydroxide to a metal to form a conductive pattern (paragraphs 23 and 35)."

Kodas et al. fail to teach that the mixing is accomplished "by a microreactor immediately before use."

Dietz et al. teach a process for mixing two liquids, with at least one containing a dispersion of solids, in a microreactor prior to ejection via a microjet (abstract, paragraph 9). The process of Dietz et al. is a cost-effective, universally applicable, technically reliable and economic process which results in a mixture which is well-dispersed and free of contamination (paragraph 7).

Therefore, at the time of the invention, it would have been obvious to one having ordinary skill in the art to mix the components of the ink of Kudas et al. in a microreactor prior to drawing the pattern on the substrate in order to economically achieve a well-dispersed mixture.

Kudas et al. also fail to teach that the substrate has "fine pores or grooves in a portion on which the printed circuit is formed."

However, Brook-Levinson et al. teach a method for fabricating printed circuit boards (PCBs) wherein the substrate is grooved in order to improve adhesion with the substrate (paragraph 24).

Therefore, at the time of the invention, it would have been obvious to one having ordinary skill in the art to provide the substrate of Kudas et al. with grooves in order to improve adhesion in the PCB.

Regarding claim 16, Kudas et al. further teach "wherein said pattern is drawn by said ink according to a pattern information stored in a computer (paragraph 234)."

Regarding claim 17, Kudas et al., as modified, teach all that is claimed, as in claim 15 above, including the application of heat in order to reduce the metal precursors (paragraph 183). Kudas et al., as modified, fail to specifically teach how the heat is applied. However, Examiner takes official notice that it was known at the time of the invention to use energy irradiation to cause heating. Therefore, at the time of the invention, it would have been obvious to one having ordinary skill in the art to conduct energy irradiation "in the process of forming said conductive pattern" in the method of Kudas et al. in order to apply heat.

Regarding claims 18, 20 and 21, Kudas et al. teach all that is claimed, as in claim 15 above, but fail to specifically mention the type of atmosphere used during the reduction process. However, Examiner takes Official Notice that, at the time of the invention, it was known to use non-reactive gases (such as nitrogen, helium, neon or argon) as the atmosphere for conducting reduction reactions in order to prevent oxidation of material being reduced. Therefore, at the time of the invention, it would have been obvious to one having ordinary skill in the art to modify the method of Kudas et al. such that "the formation of said conductive pattern is conducted in an inert gas" which is "selected from the group consisting of nitrogen, helium, neon and argon" in order to achieve the expected result of preventing unwanted oxidation in the reduction process.

Response to Arguments

4. Applicant's arguments with respect to all the claims have been considered but are moot in view of the new ground(s) of rejection.
5. Furthermore, since applicant did not challenge the Examiner's Official Notice in the previous action, it is assumed that Applicant agrees with the Examiner's assertions and therefore the assertions are taken to be fact.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSHUA D. ZIMMERMAN whose telephone number is (571)272-2749. The examiner can normally be reached on M-R 8:30A - 6:00P, Alternate Fridays 8:30A-5:00P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on 571-272-2258. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Joshua D Zimmerman
Examiner
Art Unit 2854

jdz

/Leslie J. Evanisko/
Primary Examiner, Art Unit 2854